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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,744	07/15/2003	Sridhar Srinivasan	3382-64473	8976

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EXAMINER	
RAO, ANAND SHASHIKANT	
ART UNIT	**PAPER NUMBER**
2621	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/620,744	SRINIVASAN, SRIDHAR	
	Examiner	Art Unit	
	Andy S. Rao	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/7/05 and 10//20/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 6-8 and rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al., (hereinafter referred to as "Nguyen").

Nguyen discloses a digital media signal processing system (Nguyen: figures 3A-3B) comprising: a block transform-based codec for compressively encoding transform-coding blocks of a digital media signal to form a compressed representation of the digital media signal at encoding (Nguyen: column 2, lines 25-30), and to decode blocks from the compressed representation to reconstruct the digital media signal at decoding (Nguyen: column 2, lines 30-35); a pre-processing filter for applying to overlapping blocks that overlap adjacent of the transform-coding block of the digital media signal prior to encoding by the block transform-based codec to effect spatial-domain lapped transform of the digital media signal (Nguyen: column 4, lines 25-40); a range reduction operation following the pre-processing filter for

reducing a range of coefficient values in the overlapping blocks filtered by the pre-processing filter (Nguyen: column 4, lines 40-45); and a post-processing filter for applying to overlapping blocks that overlap adjacent of the decoded blocks after decoding by the block transform-based codec (Nguyen: column 4, lines 45-65), as in claim 6.

Regarding claim 7, Nguyen discloses wherein the range reduction operation is a clipping of the coefficient values to remain within a limited range (Nguyen: column 4, lines 45-65), as in the claim.

Regarding claim 8, Nguyen discloses wherein the range reduction operation clips values of the coefficient to an input value range of the block transform-based codec (Nguyen: column 4, lines 45-65), as in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-5, 9-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al., (hereinafter referred to as "Nguyen") in view of Malvar et al., (hereinafter referred to as "Malvar").

Nguyen discloses a digital media signal processing system (Nguyen: figures 3A-3B) comprising: a block transform-based codec for compressively encoding transform-coding blocks of a digital media signal to form a compressed representation of the digital media signal at

encoding (Nguyen: column 2, lines 25-30), and to decode blocks from the compressed representation to reconstruct the digital media signal at decoding (Nguyen: column 2, lines 30-35); a pre-processing filter for applying to overlapping blocks that overlap adjacent of the transform-coding block of the digital media signal prior to encoding by the block transform-based codec to effect spatial-domain lapped transform of the digital media signal (Nguyen: column 4, lines 25-40); and a post-processing filter for applying to overlapping blocks that overlap adjacent of the decoded blocks after decoding by the block transform-based codec (Nguyen: column 4, lines 45-65), as in claim 1. However, Nguyen fails to disclose wherein the post- processing filter is not an inverse of the pre-processing filter, as in the claim. But Malvar discloses that having a post processing filter that is not a direct inverse of a pre-processing filter for a lapped transform (Malvar: column 5, lines 5-15) is known and advantageous especially if one wants to also account channel distortion (Malvar: column 7, lines 60-67). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate the Malvar teaching of using non-inverse post processing filters into the Nguyen system in order to compensate for channel distortion in the communications channel. The Nguyen system, now incorporating the Malvar teaching of using non-inverse post processing filters, has all of the features of claim 1.

Regarding claim 2, the Nguyen system, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter is more relaxed and the post-processing filter is more aggressive relative to filters that are respectively inverses of the other (Malvar: column 7, lines 20-35), as in the claim.

Regarding claim 3, the Nguyen system, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues that are less than that of a filter that is an inverse of the post-processing filter (Nguyen: column 6, lines 5-25), as in the claim.

Regarding claim 4, the Nguyen system, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the post- processing filter has eigenvalues that are greater than that of a filter that is an inverse of the pre-processing filter (Malvar: column 6, lines 5-25).

Regarding claim 5, the Nguyen system, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues and the post-processing filter has eigenvalues, such that a product of the filters' eigenvalues is less than one (Malvar: column 6, lines 5-25), as in the claim.

Nguyen discloses a digital media signal processing system (Nguyen: figures 3A-3B) comprising: a block transform-based codec for compressively encoding transform-coding blocks of a digital media signal to form a compressed representation of the digital media signal at encoding (Nguyen: column 2, lines 25-30), and to decode blocks from the compressed representation to reconstruct the digital media signal at decoding (Nguyen: column 2, lines 30-35); a pre-processing filter for applying to overlapping blocks that overlap adjacent of the transform-coding block of the digital media signal prior to encoding by the block transform-based codec to effect spatial-domain lapped transform of the digital media signal (Nguyen: column 4, lines 25-40), a post-processing filter for applying to overlapping blocks that overlap adjacent of the decoded blocks after decoding by the block transform-based codec (Nguyen:

column 4, lines 45-65), as in claim 9. However, Nguyen fails to discloses a quality metric for the block based transform, a pair of pre-processing filters and post-processing filters, and a switch for selecting a pair of pre-processing and post-processing filters from the set for use with the block transform-based codec according to the quality metric, as in the claim. Malvar discloses the use of multiple filters, both pre-processing and post-processing, and a switch of for selecting the between the various pre-processing and post-processing filter pairs (Malvar: column 7, lines 25-35: windows of modulated lapped orthogonal transforms) as based on a quality metric (Malvar: column 5, lines 10-20) in order to minimize block artifacts and minimal overall coding distortion (Malvar: column 5, lines 65-67; column 6, lines 1-4). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Malvar's teachings of quality metric dependent pre/post processing filter pairs, into the Nguyen system in order to have the Nguyen system minimize block artifacts and minimal overall coding distortion. The Nguyen system, now incorporating Malvar's teachings of quality metric dependent pre/post processing filter pairs, has all of the features of claim 9.

Regarding claim 10, the Nguyen system, now incorporating Malvar's teachings of quality metric dependent pre/post processing filter pairs, has wherein the quality metric is a quantization parameter (Malvar: column 3, lines 29-40), as in the claim 10.

Regarding claim 11, the Nguyen system, now incorporating Malvar's teachings of quality metric dependent pre/post processing filter pairs, has wherein the block transform-based codec explicitly encodes a value of the quality metric into the compressed representation at encoding (Malvar: column 4, lines 55-65), as in the claim.

Regarding claim 12, the Nguyen system, now incorporating Malvar's teachings of quality metric dependent pre/post processing filter pairs, has wherein the switch operates to enable processing of the spatial-domain lapped transform by a pre-processing and post-processing filter pair when the quality metric is indicative of low quality, and disable processing by the filter pair when the quality metric is indicative of high quality (Malvar: column 7, lines 5-20), as in the claim.

Regarding claim 13, the Nguyen system, now incorporating Malvar's teachings of quality metric dependent pre/post processing filter pairs, has wherein the switch operates to select among a bank of plural filter pairs having progressively more relaxed pre-processing filter and progressively more aggressive post-processing filter as the quality metric is indicative of decreasing quality (Nguyen: column 7, lines 25-35), as in the claim.

Nguyen discloses a digital signal encoder device for encoding a digital media signal according to a digital media block-transform-based codec (Nguyen: figures 3A-3b) applying a post-processing filter at decoding to overlapping blocks that overlap adjacent decoded transform-coded blocks (Nguyen: column 2, lines 30-35), comprising: a forward block transform for applying on a block basis to the digital media signal to transform the blocks into a transform-domain representation for encoding in a compressed representation of the digital media signal (Nguyen: column 2, lines 30-35); and a pre-processing filter for applying to overlapping blocks that overlap adjacent of the transform blocks of the digital media signal prior to the forward block transform to effect spatial-domain lapped transform of the digital media signal (Nguyen: column 4, lines 25-40), as in claim 14. However, Nguyen fails to disclose wherein the post-processing filter is not an inverse of the pre-processing filter, as in the claim. But Malvar

discloses that having a post processing filter that is not a direct inverse of a pre-processing filter for a lapped transform (Malvar: column 5, lines 5-15) is known and advantageous especially if one wants to also account channel distortion (Malvar: column 7, lines 60-67). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate the Malvar teaching of using non-inverse post processing filters into the Nguyen system in order to compensate for channel distortion in the communications channel. The Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has all of the features of claim 14.

Regarding claim 15, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter is more relaxed and the post-processing filter is more aggressive relative to filters that are respectively inverses of the other (Malvar: column 7, lines 20-35), as in the claim.

Regarding claim 16, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues that are less than that of a filter that is an inverse of the post-processing filter (Nguyen: column 6, lines 5-25), as in the claim.

Regarding claim 17, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues and the post-processing filter has eigenvalues, such that a product of the filters' eigenvalues is less than one (Malvar: column 6, lines 5-25), as in the claim.

Regarding claim 18, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has a range reduction operation following

the pre-processing filter for reducing a range of coefficient values in the overlapping blocks filtered by the pre-processing filter (Nguyen: column 4, lines 40-45), as in the claim.

Regarding claim 19, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, discloses wherein the range reduction operation is a clipping of the coefficient values to remain within a limited range (Nguyen: column 4, lines 45-65), as in the claim.

Regarding claim 20, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, discloses wherein the range reduction operation clips values of the coefficient to an input value range of the block transform-based codec (Nguyen: column 4, lines 45-65), as in the claim.

Regarding claim 21, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the block transform- based codec has a quality metric (Malvar: column 5, lines 5-25), the device comprising: a set of pre-processing filters (Malvar: column 7, lines 25-35); and a switch for selecting the pre-processing filter from the set according to the quality metric for use in encoding the digital media signal (Malvar: column 7, lines 15-21), as in the claim.

Regarding claim 22, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the quality metric is a quantization parameter (Malvar: column 3, lines 29-40), as in the claim.

Regarding claim 23, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the block transform-based

codec explicitly encodes a value of the quality metric into the compressed representation at encoding (Malvar: column 4, lines 55-65), as in the claim.

Regarding claim 24, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the switch operates to enable processing of the spatial-domain lapped transform by a pre-processing and post-processing filter pair when the quality metric is indicative of low quality, and disable processing by the filter pair when the quality metric is indicative of high quality (Malvar: column 7, lines 5-20), as in the claim.

Regarding claim 25, the Nguyen digital signal encoder, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the switch operates to select among a bank of plural filter pairs having progressively more relaxed pre-processing filter and progressively more aggressive post-processing filter as the quality metric is indicative of decreasing quality (Nguyen: column 7, lines 25-35), as in the claim.

Nguyen discloses a method of compressively encoding and decoding a digital media signal (Nguyen: column 2, lines 55-65), comprising: at encoding: applying a forward block transform to a group of adjoining transform-coding blocks of the digital media signal to produce transform-domain representations of the blocks (Nguyen: column 1, lines 45-55); and applying a pre-processing filter to overlapping blocks that overlap adjacent of the transform-coding blocks of the digital media signal prior to the forward block transform to effect spatial-domain lapped transform of the digital media signal (Nguyen: column 4, lines 25-40); and at decoding: applying an inverse block transform to the transform-domain representation of the transform-coding blocks (Nguyen: column 4, lines 45-65); and applying a post-processing filter following the

inverse block transform to the overlapping blocks (Nguyen: column 5, lines 10-30), as in claim 26. However, Nguyen fails to disclose wherein the post- processing filter is not an inverse of the pre-processing filter, as in the claim. But Malvar discloses that having a post processing filter that is not a direct inverse of a pre-processing filter for a lapped transform (Malvar: column 5, lines 5-15) is known and advantageous especially if one wants to also account channel distortion (Malvar: column 7, lines 60-67). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate the Malvar teaching of using non-inverse post processing filters into the Nguyen method in order to compensate for channel distortion in the communications channel. The Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has all of the features of claim 26.

Regarding claim 27, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter is more relaxed and the post-processing filter is more aggressive relative to filters that are respectively inverses of the other (Malvar: column 7, lines 20-35), as in the claim.

Regarding claim 28, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues that are less than that of a filter that is an inverse of the post-processing filter (Nguyen: column 6, lines 5-25), as in the claim.

Regarding claim 29, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the pre- processing filter has eigenvalues and the post-processing filter has eigenvalues, such that a product of the filters' eigenvalues is less than one (Malvar: column 6, lines 5-25), as in the claim.

Regarding claim 30, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has a range reduction operation following the pre-processing filter for reducing a range of coefficient values in the overlapping blocks filtered by the pre-processing filter (Nguyen: column 4, lines 40-45), as in the claim.

Regarding claim 31, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, discloses wherein the range reduction operation is a clipping of the coefficient values to remain within a limited range (Nguyen: column 4, lines 45-65), as in the claim.

Regarding claim 32, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, discloses wherein the range reduction operation clips values of the coefficient to an input value range of the block transform-based codec (Nguyen: column 4, lines 45-65), as in the claim.

Regarding claim 33, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the block transform- based codec has a quality metric (Malvar: column 5, lines 5-25), the device comprising: a set of pre-processing filters (Malvar: column 7, lines 25-35); and a switch for selecting the pre-processing filter from the set according to the quality metric for use in encoding the digital media signal (Malvar: column 7, lines 15-21), as in the claim.

Regarding claim 34, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the quality metric is a quantization parameter (Malvar: column 3, lines 29-40), as in the claim.

Regarding claim 35, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the block transform-based codec explicitly encodes a value of the quality metric into the compressed representation at encoding (Malvar: column 4, lines 55-65), as in the claim.

Regarding claim 36, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the switch operates to enable processing of the spatial-domain lapped transform by a pre-processing and post-processing filter pair when the quality metric is indicative of low quality, and disable processing by the filter pair when the quality metric is indicative of high quality (Malvar: column 7, lines 5-20), as in the claim.

Regarding claim 37, the Nguyen method, now incorporating the Malvar teaching of using non-inverse post processing filters, has wherein the switch operates to select among a bank of plural filter pairs having progressively more relaxed pre-processing filter and progressively more aggressive post-processing filter as the quality metric is indicative of decreasing quality (Nguyen: column 7, lines 25-35), as in the claim.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Owechko discloses a method for reducing block artifacts in digital images. Jozawa discloses a high efficiency coder and method employing overlapped motion compensation and perfect reconstruction filter banks. Antill discloses a low computational complexity digital filter bank for encoders, decoder, and an encoder/decoder.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (571)-272-7337. The examiner can normally be reached on Monday-Friday 8 hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571)-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andy S. Rao
Primary Examiner
Art Unit 2621

asr
January 16, 2007

ANDY RAO
PRIMARY EXAMINER